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RESEARCH ARTICLE

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Global and Regional IUCN Red List Assessments: 10

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Abstract

In this contribution, the conservation status assessment of two vascular plants according to IUCN categories and criteria is presented. It includes the regional assessment of *Jasione orbiculata* Griseb. ex Velen. for Italy and of *Vachellia gerrardii* (Benth.) P.J.H.Hurter subsp. *negevensis* (Zohary) Ragup., Seigler, Ebinger & Maslin for Iraq.

Keywords

Conservation, extinction risk, IUCN protocol, threats

How to contribute

The text of the global and regional assessments should be submitted electronically to Simone Orsenigo (simone.orsenigo@unipv.it) or to Giuseppe Fenu (gfenu@unica.it); the text, up to 8,000 characters in length (spaces included), must include a distribution map and a picture of the assessed species.

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Red List Assessments

Jasione orbiculata Griseb. ex Velen.

Regional assessment (Italy)
Taxonomy and nomenclature
Order: Asterales *Family*: Campanulaceae

Jasione orbiculata Griseb. ex Velen., Fl. Bulg. 375 (1891) ≡ *Jasione laevis* Lam. subsp. *orbiculata* (Griseb. ex Velen.) Tutin, Bot. J. Linn. Soc. 70: 18 (1975) = *Jasione supina* Sieber ex Spreng. var. *hirsuta* Wettst., Biblioth. Bot. 26: 75 (1892) = *Jasione orbiculata* var. *balcanica* Urum., Österr. Bot. Z. 49: 56 (1899) = *Jasione orbiculata* var. *bosniaca* Stoj., Notizbl. Bot. Gart. Berlin-Dahlem 9: 553 (1926) = *Jasione orbiculata* var. *italica* Stoj., Notizbl. Bot. Gart. Berlin-Dahlem 9: 554 (1926) = *Jasione orbiculata* var. *supinoides* Stoj., Notizbl. Bot. Gart. Berlin-Dahlem 9: 554 (1926).

Common name: Orbicular Sheep's Bit (En), Vedovella della Basilicata (It).

Geographic distribution range: *Jasione orbiculata* (Fig. 1) is a rare species with a Balkan-Apennine-Dacian distribution, described by Velenovsky in Flora Bulgarica (Velenovsky 1891), and mentioned from Macedonia (Kobelitza, Peristeri) and Bithynian Olympus (Uludağ) (Grisebach 1844). In Italy (Fig. 2), it occurs only in a restricted area of Sirino-Papa Massif (Conti and Di Pietro 2004), falling within the province of Potenza in the Administrative Region of Basilicata, more precisely at "Schiena d'Asino" (Porta 1879, as *J. supina*), Madonna di Sirino (Cavara and Grande 1913), and Mt. Papa (APP-Herbarium Apenninicum, BEOU-Belgrade Herbarium, leg. F. Conti, D. Lakusic et Ph. Küpfer 25 July 1999) (Conti and Di Pietro 2004). The Schiena d'Asino and Mt. Papa sites were confirmed by personal observations of E.V. Perrino. The extreme rarity of the species is confirmed by detailed studies in the Sirino-Papa massif (Tomaselli et al. 2007), which do not report *J. orbiculata*.

Distribution: *Countries of occurrence*: Albania, Bulgaria, Greece, Italy, Macedonia, Montenegro, Romania, and Turkey.

Biology: *Plant growth form*: perennial (chamaephyte).

Chromosome number: $2n = 12$ (material from Macedonia, Gadella and Kliphuis 1972).

Flowering time: From June to August.

Reproduction: Entomophilous pollination. At maturity, the dehiscent capsule opens by means of an apical fissure and scatters the seeds (dissemination by balistochory).

Habitat and Ecology: *Jasione orbiculata* grows on rocky meadows and gravel. Its presence seems to be linked to the rare outcrops of siliceous substrates at high altitudes (1800–2000 m a.s.l.), while it is absent where the soil is calcareous with flint. The annual average precipitation is >1400 mm, while the bioclimate is oceanic temperate of the humid upper-supratemperate type (Tomaselli et al. 2006).

Figure 1. *Jasione orbiculata* Griseb. ex Velen. at M. Papa. Photograph by EnricoV. Perrino.

Figure 2. Geographic range and distribution map of *Jasione orbiculata* Griseb. ex Velen. in Italy.

Population information: There is no detailed information available on population dynamics.

Threats: *2.3.2 Small-holder grazing, ranching or farming*: Over-grazing is a threat. In fact, although no increase in grazing has been observed for 20 years, it should be noted that the cattle farms immediately adjacent to the two confirmed sites have increased their grazing area. Moreover, the increasing demand for goat products constitutes a serious problem because goats prefer the rocky environments where this species grows.

5.2.1 Gathering terrestrial plants (intentional use): The species could be affected by collection for its beauty during the flowering period and for scientific purposes by botanists.

7.3. Other ecosystems modifications: Vegetation dynamics can originate habitat variations, which are unfavorable for the plant.

10.3 Avalanches/landslides: This species grows on rocky meadows and gravel and is subject to landslides.

CRITERIA APPLIED:

Criterion B: **EOO**: 4 km^2

AOO: 4 km^2 calculated with a 2 × 2 km cell fixed grid.

a) Number of locations: The populations occur in a very restricted area. Nevertheless, it is possible to identify two locations, both affected by over-grazing, which represents the main threat affecting the species.

b) Due to recent increase in grazing, a continuing decline in number of mature individuals (v) is expected.

Red List category and Criteria (Regional Assessment)

EN	**Endangered**	**B1ab(v)+2ab(v)**

Rationale for the assessment: *Jasione orbiculata* is a NE-Mediterranean species, that grows in southern Italy (only in the Basilicata Region). Given the very restricted area of occurrence and population size, and the detected threats expected to affect the species in the near future, the species is considered Endangered (EN).

Previous assessment: This species was previous evaluated as Lower Risk (LR) at national and regional levels (Conti et al. 1997), and more recently as Data Deficient (DD) for Italy (Orsenigo et al. 2020).

Conservation actions: *Jasione orbiculata* is unprotected by international, national and regional laws. The Italian population sites are included in two Natura 2000 sites: "Monte Sirino" (SAC IT9210200) and "Appennino Lucano, Valle Agri, Monte Sirino, Monte Raparo" (SPA IT9210271).

Conservation actions needed: Research activities and a monitoring programme are recommended in order to better understand the reproductive biology of the species and the population trend. Moreover, *in situ* and *ex situ* conservation actions are recommended, for possible plant translocation programmes, aimed at increasing the low number of individuals of the population. Finally, it would be interesting to evaluate the ecological and genetic affinities between the East-European and Italian populations.

Notes: The Italian and Romanian populations are the most threatened (the species is listed as Critically Endangered in Romania; Bartók 2014), probably as here this species reaches the distribution limits of its range.

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Vachellia gerrardii (Benth.) P.J.H.Hurter subsp. *negevensis* (Zohary) Ragup., Seigler, Ebinger & Maslin

Regional assessment (Iraq)
Taxonomy and nomenclature
Order: Fabales *Family*: Fabaceae

Vachellia gerrardii subsp. *negevensis* (Zohary) Ragup., Seigler, Ebinger & Maslin, Phytotaxa 162(3): 176 (2014) ≡ *Acacia gerrardii* Benth. subsp. *negevensis* Zohary, Israel J. Bot. 13: 39 (1964).

Common name: Talh, Talha (Arabic, طلح، طلحة).

Geographic distribution range: *Vachellia gerrardii* subsp. *negevensis* (Fig. 3) is a tree with irregular distribution from the eastern Mediterranean area to south-western Asia, but the current distribution is still uncertain. In Iraq, there is a single population, with five scattered subpopulations distributed in the Al-Najaf province (Fig. 4). This plant occurs at Birkat Al-Talhat, and along Abu Talah (mid and terminal parts) and Weier (initial and terminal parts) streams (Al-Rammahi and Mohammad 2020). It is the only native *Vachellia* in Iraq (Townsend 1968).

Distribution: Countries of occurrence: Iraq, Israel, Jordan, Kuwait (doubtful), [Palestine], and Saudi Arabia (doubtful).

Biology: *Plant growth form*: Perennial (scapose phanerophyte).

Flowering and fruiting time: Flowering from April to December and fruiting from October to February.

Reproduction: The pollination system has not been studied in detail, but many insects may play a role as pollinators (e.g., *Apis mellifera*, *Belenois aurota*, *Colotis fausta*, and *Eupeodes corolla*). Natural dispersal strategy and seed germination have not been studied yet.

Habitat and Ecology: *Vachellia gerrardii* subsp. *negevensis* is a tree up to 11 m high (often 4–5 m) growing on flat ground gathering mud sediments coming from the neighboring heights as in Birkt Al-Talhat, and at the muddy base of large wadis in the other sites. The climate is characterized by hot summers and cool winters. Although precipitation is scarce (100–150 mm/year), the region receives transitory violent rainstorms in winter (Al-Rammahi and Mohammad 2020).

Population information: There is no detailed information available on population dynamics; however, an overall monitoring carried out in 2019 shows that the population growing in the Al-Najaf Desert consists of 287 mature trees, 128 of which, even though they bloom, do not produce seeds.

Threats: *2.3.1 Nomadic grazing*: large herds of sheep, goats and camels graze randomly and affect the seedlings of the Talh tree.

3.2 Mining & quarrying: Sand and gravel quarries that provide construction works with raw material are present in the sites where the population grows.

4.1 Roads & railroads: an increasing number of 4WD off-road civilian cars use unpaved pathways among the Talh stands causing a reduction in seedling recruitment.

Figure 3. *Vachellia gerrardii* subsp. *negevensis* at Birkat Al-Talhat, Al-Najaf desert, Iraq. Photograph by Mohmmad K. Mohammad.

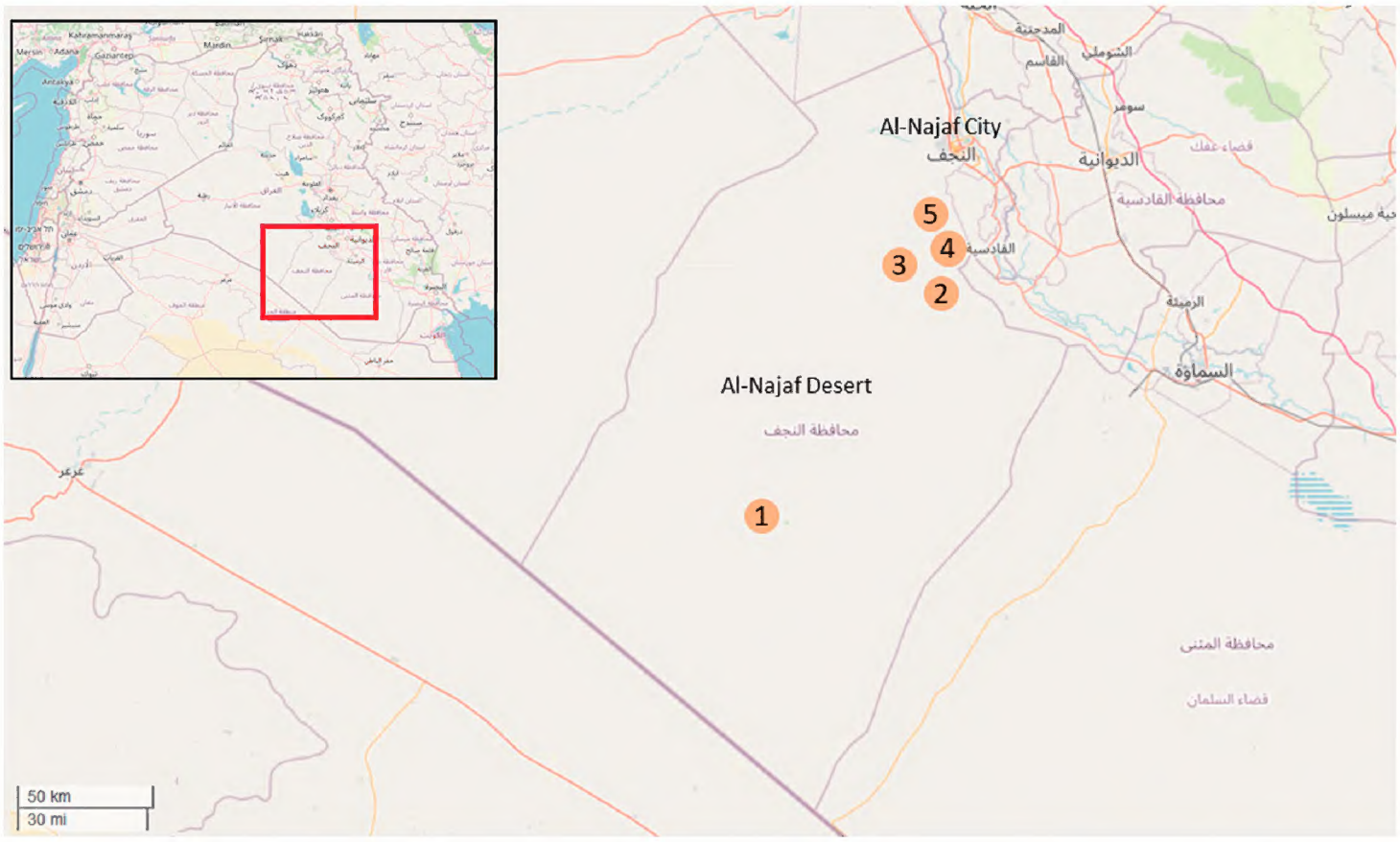

Figure 4. Geographic range and distribution map of *Vachellia gerrardii* subsp. *negevensis* in Iraq. Sub-populations: 1 = Birkat Al-Talhat, 2–3 = Abu Talah stream (mid and terminal parts), and 4–5 = Weier stream (initial and terminal parts).

There is a security ground trench at the Abu Talah stream that crosses the *Vachellia gerrardii* subsp. *negevensis* site and disturbs the natural flow of rainwater.

5.3 Logging & wood harvesting – 5.3.2: *Intentional use – large scale*: local population (Bedouins) and tourists frequently cut the main stem with the branches for fuel needs and out of 287 mature trees, 124 were recently damaged.

6.2 War, civil unrest & military exercises: continuous military activities are present in the population area.

8 Invasive & other problematic species, genes & diseases – 8.1.2 Named species: the invasive alien *Vachellia farnesiana* (L.) Wight & Arn., which is considered an aggressive colonizer, has been found in the population area.

8.2 Problematic native species/diseases – 8.2.2 Named species: the beetle *Caryedon gonagra* infests Talh seeds; observations on the seeds collected in the field indicates that > 90% of them were infested (Al-Rammahi and Mohammad 2020).

11 Climate change & severe weather (Droughts, Temperature extremes, and Storms & flooding): the rate of precipitation in the Al-Najaf desert is very low leading to severe water shortage. Conversely, recurrent floods due to stormy rains result in uprooting of some trees.

CRITERIA APPLIED:

Criterion B: **EOO:** 680.73 km^2 calculated with GeoCAT (Geospatial Conservation Assessment Tool) software (Bachman et al. 2011).
AOO: 72 km^2 calculated with GeoCAT software (Bachman et al. 2011).

a) Number of locations: we identified five locations based on the main threat (5.3.2: Intentional use).
b) Due to the severe threats observed, habitat quality (iii) is declining in all sites, as well as the number of mature individuals (v). A reduction of EOO (i) and AOO (ii) is likely to affect the species in the near future.

Criterion C: The population is composed of less than 2,500 mature individuals, subjected to a continuous decline; no subpopulation has more than 250 mature individuals.

Criterion D: The Iraqi population consists of 287 mature trees, 128 of which, even though they bloom, do not produce seeds.

Red List category and Criteria (Regional Assessment)

EN	**Endangered**	**B1ab(i,ii,iii,v)+2ab(i,ii,iii,v) + C2a(i) + D**

Rationale for the assessment: *Vachellia gerrardii* subsp. *negevensis* is restricted to a single population in Iraq located in the desert of Al-Najaf, with five subpopulations affected by several severe threats. The EOO is less than 5,000 km^2, the AOO is less than 500 km^2, and according to the main threat, we can identify five locations as well as a continuous decline in EOO, AOO, habitat quality and number of mature plants. In addition, the population is composed of 287 mature individuals, but according to updated guidelines (IUCN 2019) the population size must be considered equal to 159 mature individuals. No subpopulation has more than 250 mature individuals. According to criteria B, C, and D this taxon can be assessed as Endangered (EN) at regional level. Because geographical isolation makes any contribution of the populations occurring in neighboring countries to the conservation status of the Al-Najaf one unlikely, there is no reason for up- or down-grading the risk category resulting from this assessment procedure.

Previous assessment: This taxon is not evaluated (NE) at the global level (IUCN 2020).

Conservation actions: At present, there are no conservation measures for this species.

Conservation actions needed: It would be important to declare the Talh tree distribution area as a national nature reserve to protect it legally. This action will bring ecotourism to the area, with benefits for the local people in terms of additional income, encouraging them to protect this sustainable resource.

Notes: Phenotypic similarities between closely related *Vachellia* species make taxonomic distinction quite difficult, especially when species distributions overlap, as is the case in the Middle East and the Arabian Peninsula. Currently, it is accepted that *Vachellia gerrardii* subsp. *negevensis* also includes *V. iraqensis* described by Rechinger (1964). Recently, new names in the genus *Vachellia* for many taxa formerly included in *Acacia* subg. *Acacia* were proposed, whereby *Acacia gerrardii* subsp. *negevensis* is now called *Vachellia gerrardii* subsp. *negevensis* (Ragupathy et al. 2014).

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